



Federal Field Work Group Report to Congress on Alaska Rural Sanitation



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Federal Field Work Group Report

On

Rural Alaska Sanitation

August 1995

This report was prepared by the Water Division, U.S. Environmental Protection Agency, Region 10 on behalf of and in collaboration with the Federal Field Work Group which was composed of those agencies most directly involved in providing sanitation services to rural Alaska communities and villages. Appendix A provides a full listing of participating agencies and individual staff.

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Introductory Note

This report documents the major findings and conclusions of the Federal Field Work Group on Alaska rural water and wastewater sanitation issues. The Federal Field Work Group has been deliberating these issues over the past two years. Although the Work Group has focused more on problem identification and solution development than on accomplishments, the report devotes some space to noting progress and accomplishments over this same period. This is done in a brief section which includes a partial listing of major accomplishments.

The problems associated with Alaska rural sanitation are many and complex. While the report discusses many of the essential components of providing adequate sanitation services (e.g., planning, technology, operation and maintenance), it is important to stress that all components must be adequately addressed in order for sanitation systems to be effective. There are no simple, one-solution answers to the problem. The Work Group considered, researched, and discussed approaches to resolving many facets of the issue. In order to keep the report as brief and readable as possible, it is focused only on the major findings, areas in which agencies were able to make commitments to new or accelerated policy directions, and highest priority unresolved problems. As a result, the report undoubtedly omits issues which are of intense concern to some participants in the Work Group process. For this we apologize.

The Environmental Protection Agency (EPA) has been privileged to serve as the lead agency for the development of this report. EPA appreciates the support and cooperation that we have received over the past two years from Work Group members and other participants in the process. We look forward to continuing as a participating member of the Alaska Rural Sanitation Initiative.

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EXECUTIVE SUMMARY

The Federal Field Work Group (FFWG) on Alaska Rural Sanitation was formed at the request of Congress and charged with identifying means to improve the coordination and delivery of water and wastewater services to rural Alaska. The FFWG report examines the background and status of delivery of sanitation services and facilities in rural Alaska, identifies barriers to improvement, and provides a framework for policy direction which is intended to improve delivery of services to community and village residents whose sanitation facilities are deficient.

The report covers 268 communities defined as "Alaska rural communities." The focus of the FFWG's attention was on the 192 communities (approximately 70 percent of the total), which are Alaska Native Villages. The remaining 76 rural communities are not considered to be Alaska Native Villages; however, sanitation facilities in a number of these communities are known to be similar to those of Alaska Native Villages. In addition, these communities qualify for some of the same financial assistance programs for which Alaska Native Villages qualify.

Many rural communities have been provided with adequate sanitation due to the efforts of the residents themselves and the resources provided by government programs. However, nearly half of the Alaska Native Villages do not have drinking water delivered to residents' homes by pipes or haul systems and are served by rudimentary waste disposal systems such as privies or honey buckets. Such systems (honey buckets and individual home owner water haul) provide an inadequate and unsanitary level of service, foster public health risks, and are unacceptable to the FFWG and the Alaska Native community. The top priority objective of the FFWG is elimination of these types of systems and their replacement with systems which do not require individual residents to haul drinking water to their homes or to haul away their own wastes for disposal.

Regions of Alaska where sanitation problems are especially prevalent have characteristics that make the provision of services particularly difficult. These are as follows: very small populations so that economies of scale cannot be realized and per household system costs are very high; extremely limited cash economies which make it difficult or impossible for villages to pay utility technician salaries and other operational and management costs; remote locations, permafrost soils, harsh climates, and high energy costs all of which contribute to high construction and operation costs; and linguistic and cultural differences and perceptions which complicate communication among Alaska Native Village residents, local governments, and those agencies which provide sanitation services and facilities.

The report identifies the major impediments to achieving the objective of improved sanitation services in the approximately 90 villages with unacceptable facilities and systems. A primary need identified was to devise a means to cover the cost of sanitation operation and maintenance functions in small communities which are too cash short to pay operator salaries and other essential costs. Other identified needs included improving the availability and acceptance of alternative technologies, implementation of comprehensive community planning, training and technical assistance for community operators and administrators, increased community involvement in sanitation facility planning, and improved interagency coordination. The FFWG does not regard construction funding as a major impediment as long as recent levels of state and federal appropriations for facility construction are maintained.

Many of the approaches discussed in the report are already being implemented by agencies with a role in providing Alaska rural sanitation facilities and funding. The report identifies a number of candidate actions ("Next Steps") to improve and accelerate the delivery of sanitation services to communities and villages which are in the greatest need.

I: INTRODUCTION -- FEDERAL FIELD WORK GROUP BACKGROUND AND PROCESS

In early 1992, the state of Alaska, Department of Environmental Conservation (DEC), assembled the Alaska Rural Sanitation Task Force. The purpose of this body was to address the problem of inadequate levels of sanitation services in rural Alaska communities. The Task Force was to develop a program and recommendations to improve the low levels of sanitation services in rural Alaska communities and to increase the pace at which this problem could be solved. The 45 member Task Force represented 27 state, federal, Native and rural organizations. The Task Force and its subcommittees began work in early 1992 and in October, 1992, produced a thoughtful and comprehensive report and recommendations entitled "A Commitment to Alaskans."

Because the task of improving sanitation in rural Alaska communities is beyond the resources of any single level of government, the state of Alaska sought greater involvement from those federal agencies which have programs which directly or indirectly bear on the sanitation or related infrastructure of rural Alaska. At the request of Congress, a Federal Field Work Group (FFWG) was formed with the U.S. Environmental Protection Agency (EPA) as the lead federal agency.

The FFWG was co-chaired by Charles Findley, Water Division Director, EPA, Region 10; Larry Merculieff, City Manager of the city of Saint Paul, Alaska/representative of the Alaska Native Community; and John Sandor, Commissioner of the Alaska DEC. (A complete list of FFWG members is included as Appendix A.) The FFWG first met in May, 1993, in Washington,

D.C., with participation by federal agency Washington, D.C. staff, regional office staff, and representatives of the state of Alaska. It has met periodically in Washington, D.C., and in Alaska over subsequent months. In addition to federal agency representatives, the FFWG opened its meetings to participation by staff from Alaska State agencies and individuals representing the Alaska Native Community. The participation of these state and Alaska Native representatives was much appreciated and their contributions to the deliberations of the FFWG proved to be extremely valuable. The FFWG regards the commitment to building a relationship and the communications that developed among participants from the diverse sectors to be the most important outcome of the initiative to date.

The FFWG produced an Interim Report in January, 1994, and subsequent drafts in March, April, May, July, and October all of which were circulated widely for comment. Comments received from participating federal and state agencies and from representatives of the Alaska Native community were influential and much appreciated. In addition, members of the FFWG attended the "Rural Alaska Sanitation Summit" meeting at the Alaska Rural Development Council's conference in March, 1994, in Anchorage. At that session, a number of issues were raised by Alaska Native community representatives which the FFWG subsequently reflected in the report. As a federal workgroup report, this document contains only those findings and recommendations which reflect a consensus among federal agencies.

II: THE PROBLEM -- UNACCEPTABLE SANITATION CONDITIONS IN ALASKA RURAL COMMUNITIES

For the purpose of this report, the FFWG is considering 268 communities to be "Alaska rural communities." One hundred ninety two (192), approximately 70 percent, are defined as "Alaska Native Villages¹". These villages are listed in Appendix B. The remaining 76 communities are not Alaska Native Villages², but are included in this report since their sanitation conditions may be similar to those of Alaska Native Villages, and they qualify for some of the same financial assistance programs for which Alaska Native Villages qualify. The rural communities which are not defined as Alaska Native Villages are listed in Appendix C. Population data³ for rural Alaska communities are shown in Table 1.

Less data are available for non-native communities, however, persons knowledgeable regarding sanitation conditions in rural Alaska indicate that many of these rural communities lack modern systems as well.

The Problem is Focused in Particular Regions of Alaska

Although sanitation problems can be found throughout rural Alaska, many villages have adequate facilities or could be provided with adequate facilities through existing programs. However, in certain regions, especially substantial portions of the Yukon-Kuskokwim Delta, the Bering Strait/western coastal region,

TABLE 1 POPULATION DATA FOR RURAL ALASKA COMMUNITIES	
Alaska Native Villages	Other Rural Alaska Communities
Number of Communities: 192	Number of Communities: 76
Population: 75,000	Population: 14,000
Number of Households: 18,600	Number of Households ⁴ : 8,000

Many rural communities have adequate⁵ sanitation due to the efforts of the residents themselves, and programs administered by, and/or funding provided by, the Indian Health Service (IHS), the state of Alaska, EPA, Rural Economic and Community Development (RECD, formerly Rural Development Administration), Department of Housing and Urban Development (HUD), and staff at Alaska Native regional non-profit corporations. However, nearly half of the Alaska Native Villages are served by more rudimentary systems such as privies or honey buckets which the Alaska Native community and the FFWG regard as an unacceptable level of sanitation because of public health consequences and quality of service issues.

and the Interior, existing programs will not resolve village sanitation problems. These regions have certain characteristics that make the problem of providing sanitary services particularly difficult:

- ! Very small populations so that economies of scale cannot be realized and per household system costs are very high;
- ! Extremely limited cash economies resulting in no or low funding to pay utility technicians and system operational and management costs (villages which are cash short may still have strong subsistence economies);
- ! Village governments have limited resources and technical assistance available to them to ensure adequate operation and management of sanitation systems;
- ! Remote locations, permafrost soils, harsh climates, and high energy costs all contributing to high construction and operation costs; and

- ! Linguistic and cultural differences which complicate communication between agency staff and Alaska Native Village residents and village councils.

Descriptions of the type of conditions that prevail in many Alaska Native Villages follow. Similar conditions may very well prevail in those non-native communities which lack modern sanitation facilities. Further assessment of the sanitation conditions in non-native communities is needed and is identified as a "Next Step" in Section X.

Water Supply

Residents in nearly half of the Alaska Native Villages must haul water to their homes by hand from spigots, community watering points or community washeterias. A washeteria is a centrally located building within the community where coin operated washing and drying machines are available. In most washeterias, coin operated showers are also available. Watering points may vary from several spigots located throughout the village to a single building from which potable water is dispensed. Large trash cans are typically used in homes to store water for domestic uses such as drinking, hand washing and all other household needs.

These systems of water haul and storage are not only burdensome to residents but their improper use can contribute to disease transmission. Storage containers are often left uncovered and individuals may dip their hands into them and contaminate the water. Once this is done, the contaminated water may spread disease to the entire family.

In most of the rest of the United States, water is piped into homes. With piped water, the average per capita consumption of water is often as high as 100 gallons per day. Villagers who haul water by hand into their homes must ration their use of water and do with much less. When water is not readily available, it is difficult for people to follow good sanitation practices. For example, a single hand washing basin may be used by the entire family several times before the water is changed. Such conditions promote the spread of communicable waterborne disease. Education in public health and sanitation has improved, but is not in itself sufficient if water for hand washing is limited because community members must haul it to their homes.

Waste Handling and Disposal

Where there are no piped sewer facilities, a honey bucket is commonly used. This is a five gallon bucket which is placed in a discrete area of the home, office, or clinic, and used as a toilet. Sometimes these buckets are lined with plastic trash can bag, and sometimes they are not. If a liner is used, when the bucket is filled, the top of the bag is tied and it is carried by hand to a bunker, lagoon, tundra pond, landfill, or dumped where most convenient. If a liner is not used, the honey bucket itself is simply carried out of the home and its contents dumped. It is then returned to the home to be used as a toilet again.

In nearly one half of the Alaska Native Villages, individual and community honey bucket haul, pit privies, and bunkers are the only means of sewage collection and disposal. In most communities with piped systems, not all households are connected. Many of these unserved homes are socially part of the community but may be physically quite remote from the geographic community center. Therefore they are not likely to come within the boundaries of a defined service district. In approximately 30 Alaska Native Villages, community haul receptacles are available. In

these communities, residents carry their honey buckets or honey bucket bags to a centrally located receptacle and pour the bucket's contents into the receptacle. When the receptacle is full, a village utility worker hooks it to a vehicle and hauls it to a lagoon outside of the community for final disposal. Due to rough and uneven terrain, difficulties with snow removal, sleeting and icing conditions, and improper use of equipment by the operators, spills of human waste from receptacles occur frequently during hauling.

In some villages, particularly in the Yukon-Kuskokwim Delta, residents may deposit raw sewage in open pits and bunkers located within residential areas. During snow melt and seasonal flooding, sewage-contaminated water flows through some communities, and plastic bags of human waste are carried by the waters and spread through the community and surrounding areas.

Given these conditions, the opportunity for contamination and the passage of communicable diseases is very high. Bunkers and pits fill up, and sewage overflows and

seeps into the tundra or pools on the ground. Individuals and pets can track sewage-contaminated mud into homes and onto floors where younger children play. Residents may carry out subsistence activities such as cleaning and gutting of game and fish in close proximity to exposed human waste. Also, other disease vectors such as insects, birds, and small mammals can spread disease from contact with human waste. The scarcity of water for hand washing and other cleaning compounds these problems.

Communicable diseases such as Hepatitis A have occurred at an alarming rate. Hepatitis A is spread by fecal-oral contact, through personal contact, or when someone eats food or drinks water contaminated with the fecal material from an infected person. Between 1986 and 1989, over 2,000 cases of Hepatitis A were reported in Alaska Native Villages. The state of Alaska Office of Epidemiology estimates that 10-50 percent of Hepatitis A cases go unreported. Hepatitis A has been a contributing factor to four deaths in Alaska in the last two years⁶.

III: ALTERNATIVE SYSTEMS FOR PROVIDING A SAFE AND SATISFACTORY LEVEL OF SANITATION SERVICES TO RURAL ALASKA

The FFWG and representatives of the Alaska Native community are in agreement that villages should have water and wastewater systems that do not require individual residents to haul water to their homes or to haul human waste for disposal. The exception to this may be where residences are physically quite remote from the village center and therefore are not likely to come within the boundaries of a defined service district. Honey buckets are not acceptable for villages, and washeterias and community watering points are only interim or partial solutions to rural sanitation needs. Rural Alaska residents want and need adequate water and wastewater disposal systems.

Alternative Systems Available in Rural Alaska

A number of technologies exist which could significantly improve the sanitation conditions in rural Alaskan communities which utilize individual water haul and honey buckets. These are discussed in some detail in a recent report on Alaska Native village sanitation prepared by the Congressional Office of Technology Assessment (OTA)⁷. The FFWG recognizes that some technologies that are identified in the OTA Report, such as composting and incinerating toilets, may be demonstrated to be feasible in rural Alaska communities in the future. However, these types of facilities have not yet proven to be a solution to human waste disposal in rural Alaska villages and communities. Future changes in available products, operational requirements, or economies of operation may result in changing acceptance. At this time, piped water and sewer systems and "flush/tank"⁸ systems are the only technologies which have been demonstrated to be applicable to the Alaskan Villages in the Yukon Kuskokwim Delta, the Bering Strait/Western Coastal Region, and the Interior. These will, therefore, be the only systems to be discussed further in this report. The use of technologies such as septic tanks and drainfields is typically precluded by environmental conditions in these areas.

Piped water and sewer systems, of the type used in most American cities, provide the highest level of service and sanitation and are the technology preferred by village residents and public health professionals. Unfortunately, the cost of providing piped systems to small communities may exceed the financial ability of federal and state agencies to assist in their construction, given current and foreseeable budgetary

limitations. Also, the ability of the residents to pay for the operation and maintenance (O&M) of piped systems may preclude their construction. Physical or environmental conditions, such as an adequate supply of potable water, may also preclude the construction of piped systems in some communities. As a result, there may be a number of communities which cannot be provided with piped systems. The number of Alaska Native Villages that fall into this category cannot be known until sanitation planning is conducted; however, it is generally estimated to be in the range of 40 to 80.

The level of service provided by high capacity flush/tank systems can approach that of piped systems. The level of service by other flush/tank systems, however, can vary significantly due to the quantities of water delivered and wastewater removed. All flush/tank systems share some common features. Water is delivered to residences by vehicles (ranging from large tanker trucks to all-terrain vehicles or snow machines), and is stored under sanitary conditions in a tank in the home until used. Wastewater is stored in another tank and is periodically removed for proper disposal outside the village by vehicles similar to the water delivery vehicles.

Tanker trucks have application only in communities which have roads with a sufficient bearing capacity and the significant infrastructure needed to support this type of sanitation system. Bethel and Nome, for example, use tanker trucks for water delivery/sewage removal to serve portions of their service areas. This type of flush/tank system is not practical in most small community settings; however, light truck and small vehicle flush/tank systems may be an option for communities without fully developed road systems.

Light truck and small vehicle flush/tank systems can provide only small quantities of water, as compared to piped systems. Limited experience to date indicates that these flush/tank systems can practically provide only about five to six gallons of water per capita per day (although light truck systems have the potential to deliver larger quantities). This is not sufficient for bathing and clothes washing, which must still be done at community washeterias. (Villages with piped systems may also need to maintain washeterias since many homes may not have washers and dryers.) It must be kept in mind, therefore, that the level of service from low volume flush/tank systems is

considerably lower than that of piped systems. Also, light truck and small vehicle flush/tank systems have seen only limited use in Alaska. Further demonstration of the applicability and reliability of these systems is needed, therefore, before it can be concluded that they are a viable option for providing water and wastewater service on a larger scale.

Some concerns also exist as to whether the quantity of water which can be practically provided by light truck and small vehicle systems (approximately five to six gallons per capita per day) is sufficient to improve health conditions. Studies⁹ from Canada indicate that six gallons per capita per day are required before a public health improvement is realized. The Canadian studies, however, did not include the water available for use at washeterias (since washeterias do not exist in Canadian communities), so when the quantity of water used in washeterias is included for rural Alaskan communities, the amount of water available exceeds the six gallon per capita per day threshold.

Piped water systems provide the highest level of public health improvement over individual water haul/honey bucket systems. Flush/tank systems, pending further demonstration of their reliability and community acceptance, may also provide a similarly significant public health improvement over individual water haul/honey bucket systems. Public health improvements with both flush/tank and piped systems include:

- ! Individual residents do not have to haul water to their homes for washing, drinking, and cooking purposes. This reduces the health risk from improperly hauling and storing the water in the home, as water is delivered in enclosed tanks and stored under sanitary conditions in the homes, or is available under pressure in piped systems.
- ! Individual residents do not have to haul human waste from their homes in honey buckets where the risk of spillage or improper disposal is high. Waste is stored in an enclosed tank at the house and transported by the haul vehicle in an enclosed tank for proper disposal, or is conveyed from the house in sewers.
- ! Plastic bags used to line honey buckets are no longer needed. Plastic bags can be blown or washed around the landscape thereby increasing the potential for fecal contact and disease transmission.

Cost Considerations for Flush/Tank and Piped Systems

The FFWG has attempted to compare the costs of flush/tank systems with piped systems, but no clear consensus of opinion has emerged. Cost comparisons of the two types of technologies are very difficult to make due to site-specific considerations which can significantly affect the cost of one technology compared to the other. For example, the cost of gravel for roads needed for flush/tank systems can vary by a factor of three or more for locations where gravel is available locally as compared to where it needs to be brought in from a distant source. This difference in the cost of gravel alone may mean that in one location, where gravel is available locally, flush/tank systems may be considerably less costly to construct than piped systems. However, if gravel is not readily available, flush/tank systems can be more costly to construct than piped systems.

Another factor making cost comparisons difficult is that some villages presently utilizing individual water haul/honey bucket systems may have some sanitation infrastructure already in place which could be used in flush/tank systems. These components may include water sources, storage tanks, and sewage lagoons. Since flush/tank systems may not provide significantly more water (or generate much more sewage) than individual water haul/honey bucket systems, these existing components may be used in flush/tank systems. On the other hand, due to the greater quantities of water provided by a piped system (and the greater amount of sewage generated), sanitation infrastructure used in individual water haul/honey bucket systems would rarely be utilized in piped systems.

Finally, any comparison of costs between flush/tank and piped systems must recognize the distinctly different levels of service that the

two types of systems provide. "Their costs are clearly NOT comparable on an 'all else equal' basis."¹⁰

While acknowledging the difficulties of comparing the costs of flush/tank systems with piped systems, Colt¹¹ presented three case studies, summarized in Tables 2 and 3 below. The three specific systems were selected as being reasonably representative of the technologies actually in use or being field tested in rural Alaska. Table 2 presents "Whole System" costs, i.e., no existing facilities could be used in the upgraded sanitation system. Table 3 presents "Incremental System" costs, i.e., various existing facilities were usable, with modification, in the upgraded sanitation system. From Colt's work, some general conclusions may be drawn, subject to site-specific validation depending on such things as availability of gravel, for example. These conclusions are based only on the results of a

TABLE 2 APPROXIMATE COST COMPARISON OF WHOLE-SYSTEM¹ 20-YEAR LIFE-CYCLE COSTS PER HOUSEHOLD FOR SELECTED RURAL ALASKA SANITATION SYSTEM CASE STUDIES (Costs in present value of 1994 dollars, discounted at 4.85%)					
Case Study	Level of Service	Capital Cost per Housing Unit	Annual O&M Cost	Present Value of 20 Years O&M Cost	Total Life-Cycle
Buckland light truck flush/tank	4 gallons per person per day (g/p/d) plus showers and laundry at washeteria	46,300 to 68,600 ²	2,000	24,800	71,100 to 93,400
Mekoryuk All Terrain Vehicle (ATV) flush/tank	6 g/p/d plus showers and laundry at washeteria	41,100	2,300	28,700	69,800
Emmonak circulating water/vacuum sewer	60-80 g/p/d full piped service, including showers and laundry in houses	79,200	1,100	14,300	93,500
Notes: 1. "Whole-System" cost basis includes cost of washeteria, water treatment plant, lagoon, storage tank, and gravel roads or heavy-duty boardwalks, as appropriate. 2. Range for light truck capital costs reflects highly variable gravel requirements and costs.					

TABLE 3 APPROXIMATE COST COMPARISON OF INCREMENTAL¹ 20-YEAR LIFE-CYCLE COSTS PER HOUSEHOLD FOR SELECTED RURAL ALASKA SANITATION SYSTEM CASE STUDIES (Costs in present value of 1994 dollars, discounted at 4.85%)					
Case Study	Level of Service	Capital Cost per Housing Unit	Annual O&M Cost	Present Value of 20 Years O&M Cost	Total Life-Cycle
Buckland light truck flush/tank	4 gallons per person per day (g/p/d) plus showers plus laundry at washeteria	24,000	2,000	25,000	49,000
Mekoryuk All Terrain Vehicle ATV flush/tank	6 g/p/d with showers plus laundry at washeteria	20,000	2,300	29,000	49,000
Emmonak circulating water/vacuum sewer	60-80 g/p/d, full piped service, including showers and laundry in houses	79,000	1,100	14,000	93,000
Note: 1. "Incremental" cost basis assumes existing washeteria, water treatment plant, lagoon, storage tank, local roads, and 1/2 of boardwalk require upgrade only.					

limited analysis of three communities and therefore may not be representative of other villages currently utilizing individual water haul/honey bucket systems.

Colt's work suggests that the capital costs of flush/tank systems can be significantly less than that of piped systems, but the O&M costs can be twice as high¹². Under current programs, capital costs are paid 100 percent by the funding agencies (DEC, EPA, HUD, IHS, and RECD), and O&M costs are paid by the community. The higher level of service and lower O&M costs clearly make piped systems the village's system of choice.

Reducing capital costs per household with flush/tank systems may have the advantage of providing service to more households currently with individual water haul/honey bucket systems, assuming the same level of federal funding. This can result in net public health improvements if the lower level of service from flush/tank systems is acceptable to village residents currently with individual water haul/honey bucket systems. The issue of excessive O&M costs to the villages still

remains to be resolved. The high O&M costs may make flush/tank systems, if otherwise acceptable, unaffordable to the villages. Even the O&M costs with piped systems may be unaffordable to some villages. This may perpetuate the use of honey buckets indefinitely. However, the presentations of total life-cycle costs shown in Tables 2 and 3 suggest that a level of O&M support could be given for flush/tank systems and still result in cost savings to the funding agencies relative to the capital cost of piped systems.

An additional option for reducing the O&M burden would be to routinely fund replacement of short term capital equipment through state and federal funding programs. This would provide significant benefit to flush/tank systems, where vehicles and tank units have relatively short operating life cycles. At present, replacement of this equipment is usually treated as an O&M expense, which is a local community responsibility to fund. Although replacement of this equipment is eligible for federal and state funding, it must compete with other projects and therefore may not receive timely funding. Further public policy options for dealing with the O&M issue are discussed in the following chapter.

Pros and Cons of Flush/Tank and Piped Systems

There are many site-specific factors to be considered in selecting an appropriate sanitation system in a village. No single

technology offers the solution to the rural Alaska sanitation problem. Each community is unique and each community must play an active role in determining which system type meets their needs. There are, however, a number of general pros and cons associated with the alternative systems discussed in this chapter which are outlined in Tables 4, 5 and 6.

TABLE 4 PIPED WATER AND SEWER SYSTEMS	
PROS	CONS
Provides highest level of service and greatest health improvements.	Has higher risk of total system failure (via freeze up due to equipment malfunction or operator error
Eliminates most of the need for community washeterias	Has highest capital cost
Convenience of operation ensures greater individual commitment to use to facilitate good community health	Not suitable for communities with limited quantities of treatable water
	Amount of wastewater generated is greater than that generated by flush/tank systems, creating a larger disposal problem.

TABLE 5 LIGHT TRUCK FLUSH/TANK SYSTEMS	
PROS	CONS
Potential for significant health improvements and improved level of service, compared to individual water haul/honey bucket systems	Provides lower level of service than piped systems
Lower capital cost than piped systems	Requires further demonstration of system practicality and feasibility
Reliable haul vehicles (although service life of vehicles relatively short)	Weather may disrupt service
Overall system operation continues when individual failures occur	Requires continued use of community washeterias
Creation of more employment in the village relative to piped systems	Requires suitable road system, which is not possible where adequate supplies of gravel are not available locally
	Requires snow removal on road system
	Higher O&M costs than piped systems

TABLE 6 SMALL VEHICLE FLUSH/TANK SYSTEMS

PROS	CONS
Potential for significant health improvements and improved level of service compared to individual water haul/honey bucket systems	Provides lower level of service than piped systems
Lower capital cost than piped systems	Requires further demonstration of system practicality and feasibility
Does not require gravel road system; can operate on reinforced boardwalk system, sand roads, snow or (in some areas) natural terrain for portions of the year	Weather may disrupt service
Overall system operation continues when individual failures occur	Requires continued use of community washeterias
Creation of more employment in the village relative to piped systems	Higher O&M costs than piped systems

IV: THE OPERATION AND MAINTENANCE PROBLEM

The FFWG believes that it will not be possible to attain a satisfactory level of sanitation service in a significant number of rural Alaskan communities unless the O&M issue is addressed effectively. The FFWG regards this issue as one of its key priorities for resolution.

Proper O&M is essential if water and wastewater systems are to perform as designed. O&M is a greater challenge in rural Alaska than in the contiguous 48 states and Hawaii due to a variety of technical, geographic, climatic, and economic factors. Failure to operate and maintain systems properly can result in a range of problems. The least of these is user dissatisfaction, the worst can be user fatalities. Both have occurred in rural Alaska villages. In between these extremes are a number of very serious problems. One very common problem is excessive system wear and tear leading to increased operating costs and ultimately to premature system failure. Another potential problem is system freeze-up which can lead to total loss of systems, thereby costing millions of dollars in replacement funds.

Total system failures have occurred in rural Alaska; although in recent years total system failure due to poor O&M has been less frequent because of training and technical assistance programs operated by the state of Alaska, Alaska Native regional non-profit corporations, and the IHS. Programs which the FFWG believe have been most successful in preventing system failure and improving overall system performance are those which provide circuit riders who support rural villages. Remote Maintenance Workers (RMW's) provide technical support to village utility technicians, and Rural Utility Business Advisors (RUBAs) provide training and support to village administrative staff in utility administration and management.

Many rural Alaskan communities are very small and have cash economies that are too limited to allow them to pay technicians adequately or regularly for the work of operating and maintaining systems. Alaska Department of Community and Regional Affairs data for the 192 Alaska Native Villages show that 119 have a population of fewer than 300 persons, 145 have fewer than 100 households, and 86 have median annual household incomes of less than \$20,000 as compared to a state

non-metropolitan median annual household income of just slightly less than \$40,000. These conditions exist at least to some extent in villages in many areas of Alaska, but they are particularly prevalent in the Yukon-Kuskokwim Delta, Bering Straits and Interior regions.

Agencies involved in providing sanitary services to rural Alaska are unanimous in their opinion that poor O&M practices are contributing to accelerated deterioration and reduced useful life of sanitation systems in rural Alaska communities. Since capital construction and replacement costs are eligible for federal grants, this could result in increased federal construction budget outlays. Colt¹³ projected that better O&M could provide savings in the \$2 to \$4 million per year range once the sanitary infrastructure in rural Alaska reaches a capital value of \$1 billion:

"For example, if the average life can be increased from 15 to 16 years, the benefits from reduced annual capital replacements are \$4.2 million per year. If average lifetime is currently 20 years, but could be increased to 21 years, the benefit would be \$2.4 million per year in reduced replacement costs."

"These numbers...tell us...it is worth investing up to \$2.4 million per year in preventive maintenance just to extend the average service life of current sanitation facilities from, say, 20 to 21 years."

"..., the benefits of these life-extending measures will be growing over time as more and more facilities are added to the capital stock."

Federal and state funding agencies give priority to construction of systems in communities which have the financial, technical, and managerial capability to operate and maintain the completed facility. The types of systems provided are designed to match local capabilities for O&M. Given this approach, many villages which have honey buckets, or other systems which do not provide a satisfactory level of service, will have difficulty qualifying for sanitation improvements, such as piped systems. Increased O&M support will be necessary if these communities are to be provided, in the foreseeable future, with a

higher level of service than that provided by honey bucket systems.

Public Policy Options

Federal, state, Tribal, and local governments are faced with a dilemma regarding O&M issues. Should the expectation of proper O&M be a prerequisite to a community's receiving the sanitation infrastructure needed for basic public health? At present, agencies constructing sanitation systems are limited to three options:

1. Build systems in all communities without regard for their ability both financially and technically to operate and maintain the system.
2. Build systems in those communities that can demonstrate through reasonable assurances that proper O&M can be expected.
3. Build systems in all communities and support O&M through existing programs.

Option 1 is not the practice of any federal or state agency. This practice would result in early failure of systems that are not properly maintained and operated. It would establish a cycle of building followed prematurely by rebuilding to restore systems that failed because of lack of O&M support. Neither the public investment nor the public health would be protected by this option. Option 2 parallels the approach of the state of Alaska. The state finances projects from a Village Safe Water (VSW) priority list. That priority list ranks communities with adequate O&M capability higher than those without the financial and technical capabilities. This practice of restricting priorities for building because of inadequate O&M expectations would tend to promote the protection of the public investment. It would not, however, provide adequate sanitation to all rural communities. Option 2 would tend to perpetuate, for the foreseeable future, poor sanitation in communities that have lower technical and financial capabilities.

Option 3 parallels the current IHS practice and the state of Alaska approach with some projects. The agencies attempt to address the O&M issue with the limited resources of existing programs. This practice is implemented by sanitation project planners who consider the O&M issue when matching the type of system to be built in the community to the community's financial and technical abilities. The agencies have been able to follow this practice by

placing components of a sanitation system incrementally in communities with fewer technical and financial resources. This strategy results in sanitation facilities evolving over time and allows the agencies to marshal resources to improve community approaches to O&M before a piped system is in place. For example a community can be receiving technical training and advice on O&M issues during a period in which it moves from honey buckets to some type of haul system and finally to piped utilities. This promotes more understanding and preparation by the community for the challenge of operating, maintaining, and managing the complete system. A major disadvantage of this practice is the long time required for upgrading individual water haul/honey bucket systems. Also, no dedicated, reliable funding for O&M exists, leaving unaddressed the most difficult O&M problem, which is the lack of local financial and administrative resources to operate, maintain and manage the system. These options have worked for a subset of rural Alaska communities which are better off financially and/or in terms of administrative and managerial capability. However, a significant

number of communities exist which are unlikely to establish their eligibility under either Options 2 or 3. Many of these are communities in which sanitation conditions are considered to present the greatest public health threats. The FFWG considered approaches which could address these situations. Two models were reviewed. Both are based on the principle of choosing alternatives with low life cycle costs (capital and O&M costs combined).

The "maintenance endowment model", reported by Colt¹⁴, would involve the establishment of an O&M support fund with a portion of the facility capital construction allocation. This practice is common in a number of private universities. An endowment from the capital budget creates a support fund which totally covers O&M or is used to supplement operating funds allocated to facility maintenance. The endowment concept has not been used historically in federally-funded public works projects.

The second model is the one used in providing sanitation facilities to native villages in the Canadian arctic. It is based on identifying the lowest life cycle cost option for providing sanitation in a community and providing funding for both capital and O&M costs. The FFWG understands that this approach reduces both capital costs and total costs. This is effective in the Canadian context where a single level of government assumes responsibility for both construction and O&M. The methodology utilized in the Colt report indicates that adoption of the Canadian model in the Alaska context would allow adequate sanitation services to be extended to more communities for approximately the same cost. Although significant cost savings are available through this approach, it would be difficult to capture them in the U.S. context where responsibilities, including funding responsibilities, are divided between three levels of government -- federal, state, and local/tribal. It would also require the acceptance of alternative systems by the Alaska Native Community -- an issue which is currently under discussion.

Through its revenue sharing program, the state of Alaska provides operating money to all city governments and village governments in unincorporated communities, including tribal governments. These monies can be used for sanitation system operations or for other expenses at the discretion of the local community. Using this authority, the state could provide O&M financial resources if funded by the legislative branch. The state revenue sharing program currently provides operating money to communities but not specifically for sanitation services. Because of the importance of sanitation in rural Alaska, state policy makers have seriously examined designating a specific category of revenue sharing for use by communities in operating sanitation systems.

The FFWG identified the following as essential components in addressing the O&M issue:

- ! Continuation of the state funded Power Cost Equalization Program (for rural electric rates), Municipal Assistance Program, State General Revenue Sharing Program, Remote Maintenance Worker Program, and Rural Utility Business Advisor Program at the current or greater levels of funding.
- ! Resources for circuit riders who support rural villages on technical matters (RMW and RUBA workers) which will be adequate to allow these services to be available to all villages with a need.
- ! Increased support to improve the administrative and management capabilities of the village managers and clerks who are providing support to village O&M technicians. Although technical training in utility operation and maintenance is available, adequate training in budgeting, administration, and management skills for villagers is not.
- ! Resources to assure that village O&M technicians are paid regularly and at prevailing wage rates.

- ! Adoption of sound principles to assure community technical capability and financial responsibility as preconditions for any O&M financial support that may come from sources outside the village.
- ! Improvements in the sanitation planning process and in the means of communicating with village residents regarding their role in supporting sanitation systems.
- ! Continued attention and research on the O&M issue and examination of potential solutions.

The Alaska Rural Sanitation Task Force in its document "A Commitment To Alaskans" recommended that further research into regional management of sanitation utilities be

conducted. The idea was that some level of economies of scale and sharing of expertise could be realized by regionalization of the sanitation service. EPA funded a study to assess the potential for the formation of a regional utility to create economies of scale in system operation and maintenance in the Nana Regional Corporation (Northwest) region of Alaska¹⁵. The report from this study indicates that such a utility would not be viable in the particular region studied without outside funding support. Although regionalization may not lead directly to self-sufficiency, it may still be the best approach in some parts of the state to creating the concentration of technical and administrative expertise needed to address the O&M problem. It has support within the Alaska Native community and deserves further consideration and research.

V: THE NEED FOR COMPREHENSIVE COMMUNITY PLANNING

Comprehensive community planning for sanitation facilities¹⁶ is essential for the development of successful sanitation projects. Such planning is necessary to assure that sanitation systems are appropriate for the community, that related infrastructure (such as roads, boardwalks, and energy generation capacity) is in place, and that system support requirements are understood and accepted by the community. Without adequate planning, O&M costs may prove too costly for the community when they become apparent at a later time.

Facility planning, conducted by the agencies financing sanitation projects, addresses many of the above issues. However, facility planning needs to be supplemented by community-level planning so that the community is better informed of the alternatives available to solve its sanitation problems, can establish its own community priorities, and will ultimately support the facilities which are constructed.

The FFWG has reached consensus on the need for a comprehensive community planning process for sanitation facilities for rural Alaska communities. The process should include development of planning tools such as community profiles and information sharing networks, and engaging villages in a planning process throughout project development and construction.

The Challenge of Local Involvement in Comprehensive Community Planning

Community-level planning occurs only on a limited basis in most Alaska Native Villages. There are a number of institutional and economic reasons for this lack of planning. Villages have complex social structures and processes which are used to pass information and develop community consensus. In some communities, there may be a variety of organizations which should be involved in significant decisions such as the selection of a water supply and/or wastewater disposal system. These include the Indian Reorganization Act (IRA) or Traditional Councils and the city governments or community associations in unincorporated villages. In most communities with dual governing bodies, cooperation is achieved; however, in some communities, the working relationship can be strained or non-existent.

Some villages that have severely limited cash economies, particularly those that are small, isolated,

and subsistence oriented, do not have the resources available to develop adequate local administrative and management capabilities. These capabilities are essential if sanitation systems are to be properly planned for and ultimately accepted by the community.

While village residents are quite aware of their sanitation needs, they may not be fully aware of alternative sanitation technologies for addressing them. Knowledge of the technical, financial, administrative, and managerial burdens that alternative sanitation systems may place on individual village residents may also be lacking. This information is needed for villagers to make informed choices. Although agencies have provided this information in the past through facility planning, new and more effective formats and channels of communication must be developed and used.

Some Alaska Native leaders hold the view that in the past, systems have been constructed in communities without adequate consultation with village residents. Agencies acknowledge that systems and solutions have been implemented which may not have been fully understood or accepted by the community, despite the facility planning that takes place. Communities which did not come to regard the systems constructed as their own use terms such as "the VSW" (for a state of Alaska Village Safe Water Project) or "the PHS" (for one built by the Public Health Service, IHS) rather than terms such as "our washeteria" or others which would reflect a sense of ownership. In these cases, O&M may suffer and system deterioration accelerates. Community-level planning would help to minimize these types of problems.

While the FFWG is supportive of an expanded planning process, the process has not yet been fully defined. To ensure community support, it would need the assistance of planners, financial advisors, engineers and land managers and would require hiring of local village planners. Alaska Native non-profit regional organizations have also sought a role in this planning process, and agencies are open to discussing the possibility of conducting the planning process through some form of cooperation with these organizations. Federal (and state) utility funding agencies could work with the Rural Alaska Sanitation Coalition¹⁷ (RASC) and the regional corporations to define a comprehensive community planning process

for sanitation facilities for Alaska Native Villages, set priorities for implementation, and develop a strategy for funding planning in priority areas where it does not now exist or is insufficient to meet projected needs.

The Alaska Rural Development Council and the Department of Community and Regional Affairs (DCRA) are developing, on a limited scale, community profiles covering environmental, transportation, energy, and financial needs. These profiles will provide critical background information for villages and for federal and state funding agencies. They can be used in the village-level planning process and in the facility planning process in raising the awareness of planners and village residents of the various alternatives for addressing their infrastructure needs. Electronic profiles, such as the DCRA Rural Alaska Project Identification and Delivery System (RAPIDS) program, can be regularly updated as construction projects are approved and can provide some baseline information to assist villages in making informed community development decisions. This information sharing network, however, still needs to be expanded so villages and agencies all have easy access to current information.

Although a comprehensive community planning process for sanitation facilities for Alaska Native Villages has not yet been fully defined, the DCRA has attempted to estimate its cost, based on its experience in other communities. DCRA estimates that comprehensive community planning processes, including the cost of facility planning described below, would cost between \$175,000 and \$200,000, and take two to three years to complete, depending upon the complexity of the issues to be resolved in the village.

The Facility Planning Process

As part of the process for constructing sanitation projects, funding agencies conduct sanitation facility planning. Components of this process are shown in Table 7 on the following page.

While the planning components identified in Table 7 may adequately address the facility planning which is conducted (or funded) by the agencies constructing the project, successful development and long-term operation and management of sanitation infrastructure is dependent upon community-coordinated planning working in conjunction with agency facility planning. EPA estimates facility planning costs to be in the range of \$75,000 to \$125,000 per project, approximately 2-3 percent of the capital costs of the sanitation facilities. (This estimate for facility planning is included as part of the estimate of \$175,000 to \$200,000 for

comprehensive community planning for sanitation facilities.)

Based on current and projected levels of funding, EPA anticipates that it could fund 2 or 3 pilot projects for enhanced sanitation facility planning in the near term. Once the process for conducting this type of planning is better understood, EPA may be able to provide funding for 5 to 10 facility planning grants per year for the next four years to selected villages without adequate sanitation. Over a five year period, this would represent an investment in the range of \$2.5 to \$5 million in community sanitation facility planning. The planning itself would be somewhat analogous to the Section 201 facility planning which EPA required in its municipal facilities Construction Grant Program, but will also include a strong communications element to assure community

TABLE 7
COMPONENTS OF THE FACILITY PLANNING PROCESS

- ! Identifies existing and projected sanitation problems and water needs.
- ! Reviews alternatives and choices for a sanitation system appropriate to the community.
- ! Assures project compliance with all applicable environmental laws, regulations, and standards.
- ! Assesses local human and financial resources available for construction or O&M of sanitation improvements.
- ! Identifies capacity building and training needs and presents plan of action to build capacity.
- ! Coordinates to see that related infrastructure (e.g., roads, boardwalks, electrical generation and fuel storage) are in place to serve the sanitation system.
- ! Coordinates sanitation improvements with other projects such as housing, airport relocation, flood or erosion hazard mitigation, or economic development.
- ! Identifies potential land title problems and plan of action to address these problems.
- ! Identifies potential natural hazards which may affect the design of sanitation facilities.
- ! Identifies community plans on which to base ANCSA Section i.d.14(c) land settlements when needed to address land title issues for sanitation projects.

involvement. It is an eligible cost under EPA's Indian Set-Aside Program. If funding is available, EPA would work with villages and regional organizations to determine the feasibility of this concept.

Costs and Options for Financing Comprehensive Community Planning

There is no funding source separately dedicated to funding the community-level planning process. This is in contrast to the over \$58 million per year in federal and state funding appropriated for construction of sanitation projects in rural Alaska in Fiscal Year 1995. Identifying funds for community-level planning is one of the tasks to be accomplished under "Next Steps" in Section X. Some options for increased funding that may be considered are:

- ! Modification of DCRA Rural Development Assistance Grants and Community Development Block Grants award criteria to more strongly support sanitation planning efforts;
- ! Modification of HUD Indian Community Development Block Grant program award

criteria to more strongly support sanitation planning efforts;

- ! Review federal sanitation project funding programs to determine the extent to which these programs can support community planning efforts;
- ! Contributions from other agencies which have projects that are dependent upon, or are integral to, sanitation improvements;
- ! Community use of state capital project matching grant funds to support planning efforts; and
- ! Identify any planning activities which are currently funded to some extent as part of the existing capital projects planning and design process by IHS and VSW and determine if these funds can be provided early enough to be incorporated into the community-level planning effort.

Progress and Agency Commitments

The following are specific commitments to building local community capability and local community involvement:

- ! The FFWG members with responsibility for utility funding and construction have agreed to design and implement an expanded facility planning process with the following objectives:
 - implications of facility choices are fully understood by villages
 - systems are not delivered prior to the development of local understanding and commitment
 - villages become full working partners in the planning process and have a key role in system selection
 - village leadership and residents are prepared to support the system chosen.

The above objectives would be met primarily through planning and communications activities as opposed to engineering/design activities (although planners must involve the design engineers in the process at key points). As

recommended in "A Commitment to Alaskans" the FFWG supports the concept that this process be implemented through a separate planning grant. These planning activities would need to be completed prior to the initiation of detailed architectural and engineering designs.

- ! IHS and VSW will attempt to continue existing cross cultural training for engineering and technical staff who will be interacting with villages as part of the planning process or who will play a major role in designing systems for villages.
- ! In their planning, education, and outreach programs, funding agencies are committed to the following approaches:
 - Involve village elders and leaders, local health agencies and non-profit organizations familiar with village dynamics.
 - Provide financial, staff, or other forms of assistance to existing organizations which are involved in providing community education on environmental health issues.
 - Obtain the participation and the support of the school system and local non-profit organizations.
- ! The U.S. Natural Resources Conservation Service Headquarters is committed to review its criteria for Resource Conservation and Development Council approval and determine if they are sufficiently sensitive to conditions in Alaska. These organizations provide staff and other assistance for rural economic development efforts and could be expanded to assist in sanitation efforts.

VI: TRAINING AND TECHNICAL ASSISTANCE NEEDS

Training

The FFWG believes that it will not be possible to improve sanitation in a very significant portion of rural Alaska unless assistance and resources are available enabling community governments to successfully meet the specific challenges required to maintain and manage sanitation facilities. The FFWG regards the need to build village capability as a key priority. The existing training and technical assistance programs must continue and be expanded so that capital investments in rural Alaska villages will not be jeopardized and public health threatened.

The village capability issue is critical to timely delivery of systems to those communities with the greatest need. The FFWG believes that even if capital funding were available immediately to provide piped utilities in all communities which are currently using honeybucket systems, it would be years before systems could be constructed in many of them. This time is required to train technical and administrative staff to operate systems. In addition, as described in earlier sections of this report, some villages may never qualify for system funding because they lack the ability to pay operation and maintenance costs.

Local governments are responsible for the management, operation, maintenance and administration of sanitation facilities constructed with state and federal funding. Qualified utility managers and operators, proper bookkeeping and accounting procedures and the support of a strong government are therefore crucial to the ongoing success of sanitation systems. Personnel in rural Alaska communities often do not have the training and technical background necessary to carry out these responsibilities. This lack of training can result in the malfunction, freeze-up, or total breakdown of systems.

Of equal, if not greater importance, is the need for community managers to operate water and sewer utilities like a business. Budgetary issues, compliance with numerous state and federal regulations, and implementation of local ordinances and policies need to be addressed if acceptable sanitation service is to be maintained. The state has initiated an introductory course in Utility Management, however, it needs to be expanded and more advanced course work developed and delivered.

Also, there is little training for clerks who are responsible for accounting, bookkeeping, billing, collection, and numerous other duties vital to operating utility systems. A comprehensive training program is needed for managers, operators and clerks which includes short courses held in rural hub communities and mid-level and advanced "fast track" courses at a centralized training center.

Technical Assistance

As villages gain the skill and acquire the resources to run sanitation systems, they will rely on technical support from various state, federal, and Native regional health and social non-profit agency programs. While technical support is currently available from these sources, it needs to be expanded, as discussed below.

Programs which the FFWG believe have been most successful in preventing system failure and improving system performance are those which provide circuit riders who support rural villages. All parties involved in Alaska rural sanitation recognize and appreciate the value of these programs in developing local technical and administrative capacity, avoiding system failures, supporting proper operation of systems, and promoting practices that prevent accelerated system deterioration. The three major technical assistance programs are described below:

The Remote Maintenance Worker Program

The state currently supports nine Remote Maintenance Worker (RMW) positions through Regional Native and Non-Profit Health Corporations. Acting as circuit riders, RMWs provide assistance to 126 villages. Funding for six additional RMWs is needed in order for the program to provide coverage to all villages needing assistance. RMWs protect the state and federal government investment in rural sanitation systems. In short, they represent an insurance policy by providing skilled technical assistance to communities, troubleshooting during emergencies, and conducting one-on-one training for local operators. Each RMW provides services to 10-15 villages at an annual cost of approximately \$100,000 per position. This is a small price to pay in comparison to the cost of replacing, rebuilding, or rehabilitating expensive utilities after irreversible system damage occurs. Since 1989, there have been no full-system failures in villages served by the RMW program.

The Rural Utility Business Advisor Program

Rural Utility Business Advisors (RUBAs) equip communities with the necessary skills to manage their utilities like a business by providing on-site training and assistance in the following areas: utility organizational structures; budgeting; billing procedures and policies; financial and personnel management; user fee structures; accounting; contract negotiations; and solid business practices. Acting as circuit riders, RUBAs provide a four step training and support program. First, a working relationship with village leaders and managers is established. Second, the budgeting, record keeping, and accounting practices of each village are assessed as are the proficiency level of key village personnel. The system of arriving at user fees is reviewed together with the method and success rate of fee collection. Third, based upon these assessments, a training program is developed to meet the unique needs of each village. Fourth, using one-on-one, over-the-shoulder training, RUBAs: work through the budgetary process with village personnel offering advice and teaching budgeting techniques; work with clerks as they make book entries and assist

them in setting up and maintaining accounting systems; teach clerks and managers methods for handling contracts and purchasing equipment and supplies (such as oil and chemicals); assist village councils in establishing user fee schedules and collection procedures; identify and explain relevant federal and state regulations and what must be done in order to comply with them.

Currently the state funds two RUBA positions and the federal government, through EPA, funds one. Funding for twelve additional RUBA positions is needed in order for all villages requiring assistance to have access to a RUBA.

The IHS Operation and Maintenance Specialist Program

Three IHS O&M specialists are currently stationed in Anchorage. They provide three distinct types of service to communities. These include: (1) construction project support; (2) training, both one-on-one and in the classroom, and (3) community operations support to operators, managers, and RMWs. The O&M specialists can provide service to all Native communities in Alaska.

Construction project support includes plan and design review, construction site visits, writing operations and maintenance manuals, preventive maintenance planning, and hands-on startup training for new facilities. Classroom training sessions include a boiler operator course and a basic water plant operator course. In the past, courses in water treatment, fluoridation, electrical controls, and utility management have been provided. Community operations support includes telephone support in providing technical assistance in facility operations, emergency response, routine site visits, and annual winterization visits. The winterization program is a preventative activity in which facility components are reviewed prior to the onset of winter, and recommendations are provided to minimize the potential for catastrophic winter failure.

VII: EXTENT OF THE FINANCIAL NEED - BEST ESTIMATES

The cost of meeting the sanitation needs of rural Alaska communities is estimated at \$1.3 billion assuming the provision of piped water and sewerage facilities in every community. However, as noted earlier in the report, there may be a number of communities which cannot be provided with piped systems. This estimate was arrived at by totalling cost estimates provided by the IHS Sanitation Deficiency System (SDS), DEC and EPA. These estimates are shown below in Table 8.

communities, the total cost might be reduced to a level below \$1.3 billion.

The SDS estimate includes the funds required for currently-identified needed repairs, enhancements, and improvements to systems in villages which presently have adequate levels of service. The SDS estimate does not, however, include the needs resulting from population growth in Alaska Native Villages. Current projections by the State of Alaska

TABLE 8 ESTIMATED COST TO PROVIDE PIPED WATER AND SEWERAGE FACILITIES IN RURAL ALASKA Expressed in Millions (1994 dollars)				
Construction Needs (SDS)-Alaska Native Villages ¹ , Excluding North Slope Borough	Construction Needs-Other Rural Alaska Communities ²	Construction Needs (SDS)-North Slope Borough ³	Facility Planning ⁴	Total
\$561	\$420	\$300	\$10	\$1,300
Notes: <ol style="list-style-type: none"> 1. U.S. Department of Health and Human Services, Sanitation Facilities Deficiencies for Indian Homes and communities: Annual Report presented to the President of the United States of America and to the congress of the United States (Washington, D.C.: Department of Health and Human Services, February 1992). 2. Kelton, Keith, Director, Facility Construction and Operation, Alaska Department of Environmental Conservation, Juneau, Alaska, personal communication, June 6, 1994. 3. Reported previously in SDS. The North Slope Borough will finance sanitation improvements in the communities within its boundaries with its own funds raised through a bond issue. 4. Veit, Kathy, Chief, Program Coordination Branch, Environmental Protection Agency, Region 10, Seattle, Washington, personal communication, October 19, 1994. 				

The SDS estimate assumes that management and engineering services are provided by IHS, and the cost of these services is not included in the SDS estimate. If these services must be contracted, costs would increase by 20 to 40 percent¹⁸. A similar situation pertains to projects managed by the state of Alaska DEC¹⁹. If these services were to be contracted, projections of construction costs for all villages and communities would be in the \$1.5 to \$1.7 billion range. If flush/tank type systems were constructed in some villages and

Department of Community and Regional Affairs indicate that this population is likely to double within the next 20 years. The SDS is updated annually and is considered to be the most comprehensive and up-to-date system for projecting unmet sanitation needs in Alaska Native Villages.

The state's estimate is based upon: (1) the 1990 census data which shows that in the rural communities that are not defined as Alaska Native Villages, there are approximately 7,000

households²⁰ which are not served by a piped water and sewage system, and (2) an estimated average cost of \$60,000 per household to provide a piped water and sewerage system. This estimate is not considered to be as accurate as the estimates in the SDS.

Federal funding for Alaska rural sanitation is directed primarily at meeting the needs of Alaska Native Villages which are reflected in the SDS estimate of \$561 million which is set forth in the first column of Table 8. Funding appropriated to IHS, HUD, and to EPA via the Clean Water Act Indian Set Aside are restricted to use in Native Villages. Federal funding appropriated to RECD and State funding appropriated to VSW can be utilized in either Alaska Native Villages and other rural communities. Some funds appropriated to EPA have also been available for use in both Native Villages and other communities. All funds are allocated according to priority systems which rank projects according to factors which consider both need and readiness to manage sanitation systems.

At the \$60-70 million level of funding that has been available over the past four years, it might appear that all sanitation needs identified by the IHS SDS would be satisfied in less than 10 years, and the needs of those villages with the lowest levels of service could be met in seven years (of the \$561 million estimate from the SDS, \$420 million is for providing piped utilities to the approximately 20,000 individuals in 4,700 households in the 90 Alaska Native Villages which utilize honeybuckets). Funds cannot, however, be focused exclusively on the villages with the most serious public health problems because, as discussed previously, many villages do not have the cash resources to meet O&M requirements and therefore could not qualify for funding unless an outside source of funding for O&M salaries became available. Also, additional funds would be required during these years for repairs, enhancements and improvements to existing systems. Stable funding, however, at the Fiscal Year 1995 level (\$60 million) may be necessary if state and federal agencies and the communities are to plan for, design and construct sanitation facilities in an orderly manner and eliminate honey buckets in the foreseeable future.

The FFWG examined the issue of unserved homes which are located in Alaska Native Villages which have piped systems. Data from the 1990 census indicates that there may be a large number of such

homes. If correct, this would imply substantial additional capital costs beyond current SDS estimates. IHS staff examined a limited sampling of Alaska Native Villages to determine the accuracy of these data. Their sampling suggested that the number of unserved and occupied homes in communities with piped systems was overestimated by the census. Further, IHS believes that for the most part, unserved homes are isolated from community centers and not part of the area which would be reasonable to include in a defined utility service district. These unserved homes generally do not present a community-wide public health risk because of their separation from the areas in which population is concentrated.

Facility planning costs are estimated by EPA at \$10 million, for the villages currently without adequate sanitation facilities. The FFWG is in agreement that in addition to facility planning, comprehensive community planning for sanitation facilities is essential for the development of successful sanitation projects. The estimated cost for comprehensive community planning, based on the experience of the Alaska Department of Community and Regional Affairs, is \$10 million in addition to the costs for facility planning. Planning needs are discussed in more detail in Section V.

Capital projects alone will not solve the sanitation problems in rural Alaska. Experience has shown that adequately skilled utility operators and managers are equally vital. The estimated annual cost to provide training and technical assistance in the subset of villages where is most critical to provide such assistance is \$2.8 million. This figure provides for RMW circuit riders to cover approximately 200 villages and communities versus the current 140, for RUBA circuit riders to cover the same number of villages versus the current

30, and for the development and implementation of a multi-component training and education program in rural utility O&M. These cost estimates for these activities

summarized in Table 9 below along with current funding. The programs that are associated with these activities are discussed in more detail in Section VI.

TABLE 9 ESTIMATED ANNUAL COST TO ADDRESS TRAINING AND TECHNICAL ASSISTANCE Expressed in Thousands (1994 dollars)			
	Remote Maintenance Worker Program	Rural Utility Business Advisor Program	Training and Education Program
Total estimate to provide support to all candidate villages	\$1,500	\$1,500	\$1,350
Current Funding	\$900	\$300	\$350

VIII: PROGRESS IN IMPROVING THE SANITATION FACILITIES IN RURAL ALASKAN COMMUNITIES

Up to this point, this report has focused on the problems and existing needs for sanitation facilities in rural Alaskan communities. Despite the daunting existing needs, considerable progress has been made by federal and state agencies and Alaskan native organizations. Recent accomplishments (other than sanitation facility construction) are described below, followed by a summary of construction-related funding since 1960.

Progress Over the Past Year

One of the most significant accomplishments of the FFWG has been the improved communication among federal and state agencies and representatives of the Alaska Native community. This has resulted in a better understanding of the many different views, opinions and interests that exist regarding the complex sanitation problems in Alaska Native Villages. Although "improved communication" is an intangible, it is essential to future progress, and has produced valuable input for this report. In addition, the recognition of the need for a stronger partnership has resulted in the following specific actions:

- ! The Alaska Native community working closely with the Alaska Native Health Board has taken the initiative to form the Rural Alaska Sanitation Coalition (RASC), a statewide group which will provide an Alaska Native community voice on rural sanitation issues.
- ! RASC has taken the initiative to obtain a \$60,000 grant from the Alaska Housing Finance Corporation.
- ! EPA has provided a \$50,000 dollar grant to RASC for staff, meetings, and other costs.
- ! Federal and state agencies and RASC cooperated to organize a day long "Alaska Rural Sanitation Summit" at the Alaska Rural Development Council's Conference held in Anchorage in March 1994.

The Alaska Native community should be acknowledged for introducing or emphasizing certain issues that have been important in FFWG deliberations, particularly the issues of village

capability, the complexity of village social and governing organizations, and the role of the Regional Native non-profit corporations.

The following is a partial listing of major actions taken by federal and state agencies to improve Alaska rural sanitation over the past year:

- ! Provided circuit rider funding for technical assistance to Alaska Native Village O&M technicians and system administrators. (EPA -- 1 RUBA; IHS -- 3 O&M Specialists; state -- 2 RUBAs, 9 RMWs; Regional Native non-profit corporations -- support to RMWs and RUBAs)
- ! Provided training for village operators, managers, and clerks, in addition to above circuit riders (state -- \$590,000).
- ! Provided Technical Assistance and Training (TAT) grants to the Association of Village Council Presidents and the Tanana Chiefs Conference to assist villages to develop the administrative capacity for addressing water and wastewater issues. (RECD--\$429,300)
- ! Provided Indian General Assistance program grants to Alaska Native Villages for integrated environmental planning. (EPA--\$473,000)
- ! Recognized the importance of continued and increased funding of the Power Cost Equalization, Municipal Assistance, and General Revenue Fund Sharing Programs for assisting in financing operation and

maintenance. (Since these programs do not have funds separately dedicated to O&M, it is not possible to estimate the amounts from these programs which are being used for O&M. However, it is the opinion of the FFWG that these programs are vital for meeting O&M needs.)

- ! Cooperated to unify their construction eligible project priority lists in order to achieve more efficient use of funds available to address rural Alaska sanitation problems. (IHS, HUD, RECD, and DEC)
- ! Developed "Minimum Sanitation Guidelines" for HUD-assisted homes in communities without piped utilities. These are consistent with the recommendations set forth in "A Commitment to Alaskans" prepared by the Alaska Rural Sanitation Task Force. (IHS and HUD)
- ! Awarded a construction contract for 21 HUD-assisted homes in Alakanuk, 12 homes in Eek and 25 homes in Hooper Bay all of which are designed to comply with Minimum Sanitation Guidelines for Communities without Piped Utilities. (Association of Village Council Presidents Regional Housing Authority with HUD funding)
- ! Revised program regulations to exclude donations of non-federal funds from the maximum Total Development Cost Limit for each project. Previously, non-federal donations to the project could not cause the project cost to exceed the Total Development Cost Limit without approval of an administrative waiver which caused delays and uncertainty in the planning process. (HUD)
- ! Funded four rural village utility road projects with federal funds from the Intermodal Surface Transportation Efficiency Act (ISTEA) program. (Alaska Department of Transportation/Public Facilities with U. S. Department of Transportation funding)
- ! Promulgated an accelerated "Alternative Permit Process" for sanitation facility projects. (Corps of Engineers)
- ! Agreed to keep IHS and VSW informed of systems in substantial non-compliance with drinking water regulations so that IHS and VSW

can offer those communities with water and wastewater related projects under way additional technical assistance to expedite compliance with the goal of avoiding penalties and enforcement actions. (EPA, DEC-Drinking Water Program)

- ! Agreed to work cooperatively with IHS, VSW and others to identify alternative treatment technologies to assure microbiologically safe drinking water through successful implementation of the Surface Water Treatment Rule in rural Alaskan communities. Such technologies must be cost effective for very small systems, operationally simple, and tolerant to harsh environmental conditions. (EPA)
- ! Reached agreement to coordinate their efforts to assist villages in developing information on system vulnerability and contaminant use to assure application of cost saving monitoring waiver provisions where applicable. (EPA, IHS, DEC)
- ! Agreed to participate in a group that has been established by DEC and DCRA to represent agencies involved in sanitation and site control issues. The group will meet on a periodic basis to identify particularly difficult site control issues in communities where sanitation projects are being planned. The group will assess the site control issues and either identify an approach that resolves the issues or advise the construction agencies that no resolution appears possible within proposed project schedules. [Bureau of Land Management (BLM), Bureau of Indian Affairs (BIA), DEC, IHS and DCRA]

- ! Agreed to encourage and support DEC in developing Individual System Strategies for villages to assure that appropriate measures are taken to maintain or rapidly return systems to compliance with drinking water requirements. (EPA and IHS)
- ! Requested that Congress, through reauthorization of the Clean Water Act (CWA) and Safe Drinking Water Act (SDWA), increase the existing CWA facility construction Indian Set-Aside from 0.5 percent to 1.0 percent, and establish the proposed SDWA facility construction Indian Set-Aside at 1.5 percent. (EPA)
- ! Requested that Congress, through reauthorization of the CWA, provide the authority to use up to four percent of the grants made under the facility construction Indian Set-Aside program for management and is supporting the use of up to one percent of the facility construction Set-Aside for technical assistance to recipient communities. (EPA)

All parties are committed to continue in a cooperative mode to pursue and to further develop the policy initiatives and next steps identified in this report and to coordinate their ongoing program activities.

Funding for Construction of Drinking Water and Wastewater Facilities

Over the past four Fiscal Years (1992-95) an average of over \$60 million per year in state and federal funds have been appropriated for design and construction of water and wastewater systems for Alaska Native Villages/rural Alaska communities. Cumulative federal and state funding for Alaska rural sanitation construction since 1960 exceeds \$750 million.

Table 10 on the following page lists total historical funding by agency including both state and federal sources from 1960 through 1995. State and federal funding by year since 1980 are portrayed in Figure 1. Figure 2 indicates the sources of federal funds by agency.

These funds have resulted in significant progress. Approximately 50 percent of rural Alaska village residents have piped water or wells and piped wastewater systems or septic systems. Nevertheless, approximately 20,000 individuals in 4,700 households in 90 villages live with the lowest level of service--water hauled by individual householders and honey buckets or pit toilets.

TABLE 10
FUNDING FOR ALASKA RURAL SANITATION CONSTRUCTION
(In Thousands of Dollars)

YEAR	RECD	IHS	HUD	EPA ¹	TOTAL FEDERAL	VSW	DOA	TOTAL STATE	GRAND TOTAL
1960-1979	884	141,228	0	0	142,112.00	13,250.00	0	13,250.00	155,362.00
1980	3,437	8,326	0	0	11,763.00	10,000	0	10,000.00	21,763.00
1981	1,153	13,782	0	0	14,935.00	0	1,501	1,501.00	16,436.00
1982	0	11,237	0	0	11,237.00	1,609	6,597	8,206.00	19,443.00
1983	4,594	9,080	3,499	0	17,173.00	515	15,131	15,646.00	32,819.00
1984	2,763	5,573	2,347	0	10,683.00	691	53,804	54,495.00	65,178.00
1985	0	8,966	2,646	0	11,612.00	7,972	11,931	19,903.00	31,515.00
1986	274	4,780	9,251	0	14,305.00	867	12,035	12,902.00	27,207.00
1987	599	2,742	3,085	0	6,426.00	10,381	19,773	30,154.00	36,580.00
1988	1,813	3,946	2,250	0	8,009.00	5,623	6,521	12,144.00	20,153.00
1989	0	8,290	3,474	6,694	18,458.00	6,239	3,610	9,849.00	28,307.00
1990	395	6,200	4,385	1,700	12,680.00	11,164	2,802	13,966.00	26,646.00
1991	4,966	14,250	2,392	0	21,608.00	6,853	1,538	8,391.00	29,999.00
1992	3,600	16,670	3,435	6,730	30,435.00	27,158	0	27,158.00	57,593.00
1993	5,450	19,223	3,668	3,258	31,599.00	24,503	0	24,503.00	56,102.00
1994	18,259	18,400	4,688	3,183	44,530.00	26,732	0	26,732.00	71,262.00
1995	3,259	18,500	5,243	17,161	44,163.00	19,900	0	19,900.00	64,063.00
	51,446.00	311,193.00	50,363.00	38,726.00	451,728.00	173,457.00	135,243.00	308,700.00	760,428.00

Note:

1. EPA figures for 1989 through 1994 are actual obligations; 1995 is estimated based on EPA operating plan and includes a special appropriation of \$15 million for Alaska rural sanitation construction and a projected \$2.161 million from the Indian Set Aside program for wastewater construction.

Figure 1: Alaska Rural Sanitation Construction Funding, State and Federal

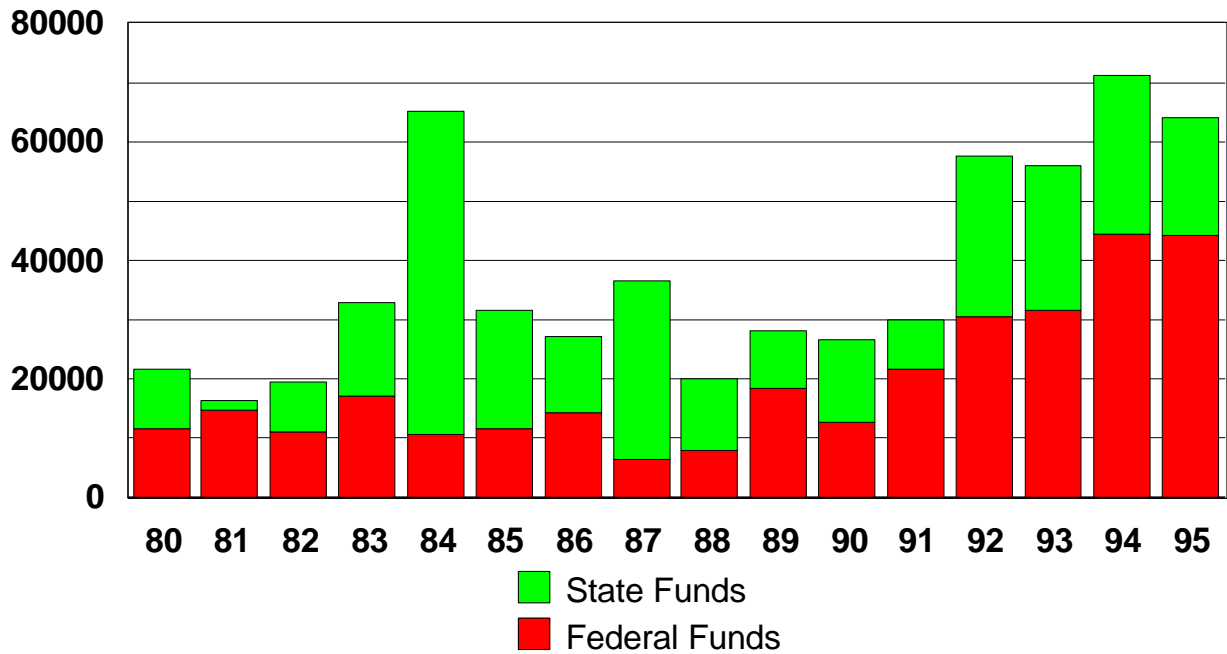
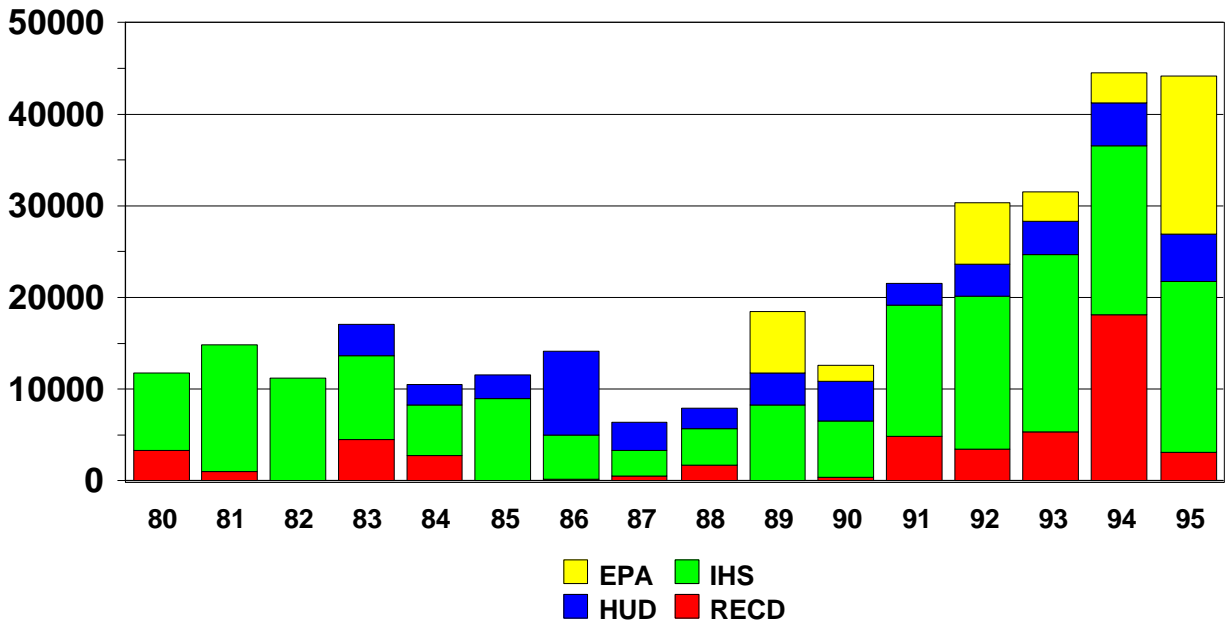


Figure 2: Alaska Rural Sanitation Construction Funding, Federal Funds by Agency



IX: AGENCY COORDINATION

Members of the FFWG, the Alaska Sanitation Task Force, and the RASC have agreed to participate in on going coordination efforts through meetings and forums between and among their organizations. As a group, member agencies and organizations will strive to work together to define challenges, forge new partnerships and enhance old ones, and seek strategies, options, and solutions to improve the delivery of sanitation services in rural Alaska communities. The FFWG believes that this commitment to coordinate, cooperate, and collaborate is essential to addressing village sanitation needs in a timely and efficient manner.

The FFWG agreed to meet annually to analyze progress, discuss issues and coordinate activities involving: (1) land titles, (2) utility roads, (3) training and technical assistance, (4) regulatory efficiency, and (5) funding needs. This meeting will document and report on progress annually. A discussion of the issues and approaches required to address each issue effectively is as follows:

Land Titles

A large backlog of land surveying work exists in Alaska as a result of land selections under the Alaska Native Claims Settlement Act of 1971 (ANCSA), and individual Native land allotment applications. The lack of surveys has caused uncertainty regarding title to lands on which facilities may be constructed. This problem has delayed installation of facilities in a number of cases and can result in added costs to the community or the funding agency if facilities are constructed on property which later is found not to be controlled by the community. BLM, which is responsible for the land surveys, has agreed to work with the agencies and Alaska Native organizations to address this issue by reviewing early drafts of annual village sanitation project priority lists and identifying villages where unsurveyed Native allotments and pending allotment applications may be present. Native allotments identified through this process will be made a BLM survey priority, and/or planning will be adjusted to minimize potential land ownership conflicts.

Utility Roads

Geographic, climatic, and economic conditions in many rural communities make piped utilities impractical or infeasible. In such cases, residents frequently select water and sewer haul systems as preferred project alternatives. However, in most cases haul systems require roads or boardwalks with a bearing capacity adequate to handle transportation vehicles (i.e., trucks or all terrain vehicles). This type of infrastructure is missing in many rural Alaska communities desiring haul systems.

Unique language contained in the Intermodal Surface Transportation Efficiency Act of 1991 made it possible for the state to earmark funding specifically for rural village utility roads. In order to use these limited funds in the most efficient way, the Alaska Department of Transportation/Public Facilities (DOT/PF) coordinates with DEC and IHS on priorities for sanitation needs. This coordination process has proven effective.

The BIA has also agreed to attend and participate in future interagency coordination meetings regarding utility roads. The BIA administers the Indian Reservation Road program and also keeps an active inventory on village infrastructure. This information will be coordinated with data developed by others (DEC, DOT/PF, IHS, DCRA, Alaska Native organizations, etc.) to further assess the need for utility roads in rural villages.

Training and Technical Assistance

Currently, DEC, IHS, the Governor's Water and Wastewater Board, and private trainers meet on a regular basis to discuss operator training and certification related issues. Although rural training and technical assistance issues and the findings of the Sanitation Task Force are discussed during these meetings, they are not the primary focus. These agencies, Alaska Native organizations and individuals involved in various types of training and technical assistance relating to village sanitation have agreed to consult and coordinate with each other on a periodic basis. This will ensure the most efficient use of limited existing resources and provide an opportunity to develop a financing plan to address training and technical assistance needs which are not currently being met.

Regulatory Efficiency

This issue arises from comments during FFWG meetings that some federal and state regulatory requirements are not justified by the small benefits that they provide in the rural Alaska setting. Agencies are prepared to examine any particular requirements which are identified to

them as meeting this description. The objective will be to determine the extent to which flexibility exists in interpreting each requirement and, if possible, applying alternative implementation approaches in rural Alaska. In addition, enforcement and regulatory staff are open to improved communications and to meeting with organizations or individuals and taking other steps which will allow them to become more sensitive to conditions in rural Alaskan villages and communities.

Funding

Funding has been previously discussed in the sections of this report dealing with operation and maintenance, planning, training and technical assistance, and sanitation facility construction. Funding needs will remain a major issue of discussion with the FFWG.

X: NEXT STEPS

The FFWG has fulfilled its initial charter with the completion of this report. The challenge now is to institutionalize and strengthen the relationships that have developed through the FFWG effort. An initial step will be to develop a work plan for the next year with concrete objectives. Agencies are committed to do this with participation by a broader group, including Alaskan Native community representatives. The issue of the appropriate agency to be the lead federal agency for the continuing effort also must be discussed.

A preliminary listing of candidate tasks and measures of success which have been suggested for inclusion in the work plan are as follows (not in priority order). Given limited resources, the FFWG will identify from this list a smaller subset of up to five or six priority tasks on which to focus during the upcoming year.

1. Establish a process and structure to maintain momentum, improve coordination, and assure that obstacles to improved delivery of rural sanitation systems on the federal and state level are addressed and overcome in a timely manner.

Measure of success: Using this report and "A Commitment to Alaskans" as points of departure, work with state and federal agencies, RASC, Regional Native health corporations and local and tribal governments to improve the process for constructing systems through actions at the state and federal level and to develop a process for regularly reporting progress at annual coordination meetings.

2. Recognize and support RASC as a consultative and advisory organization to federal and state agencies; support and strengthen the working relationship between agencies and the Alaska Native community. (Note: Consultation with RASC does not replace the government to government consultation required when projects are being planned and implemented in a particular community.)

Measure of success: Federal and state agencies and the Alaska Native community support RASC as a statewide representative on

environmental issues and the Alaska Native community recognizes RASC as a means to effectively channel their sanitation concerns.

3. Improve the community planning process for sanitation facilities.

Measure of success: Development of a coordinated effort between federal and state agencies and RASC outlining how the planning process will be conducted and financed, the opportunities that community residents will have to participate in the process, and a definition of the roles of villagers and Alaska Native regional organizations in the planning process.

4. Review needs for training for rural sanitation operation, administration, and management; evaluate the nature and availability of existing training programs; identify constraints; and develop a plan to assure the coordination and delivery of adequate training for village O&M technicians, administrators, managers and clerks.

Measure of success: Completion of a plan, reviewed by the FFWG and Native organizations, and implementation begun by the agencies and organizations with responsibility for training.

5. Identify federal funding programs with the potential to provide resources for improving operation and utility administration. Develop a program to promote more and better funding applications that support community utility operation and management through grant writing workshops and other means.

Measure of success: Set and achieve targets for delivery of grant writer training to staff in Alaska Native Village governments. Increase the number of grant requests submitted from rural Alaska for sanitation and related projects such as training and governance capability building.

6. Recognize the need and support the development of visual, cross cultural, bilingual

means to communicate with Alaska Native Villages about sanitation facility alternatives and the facility planning process.

Measure of success: Completion of a report which evaluates the cross cultural communications programs of each of the agencies, especially regulatory agencies, working with Native villages and make recommendations for cross cultural media for presenting to Alaska Native Villagers the importance of sanitation systems, the physical characteristics of various alternative systems, and their administrative and technical pros and cons.

7. Develop and evaluate the utility service area (regionalization) concepts that have state, federal, tribal and local government support; identify state, federal and private funding and consider legislative authority to implement, at least as a pilot.

Measure of success: Completion of a report which evaluates the utility service area (regionalization) concepts.

8. Review existing public hygiene education programs/delivery methods and identify needed improvements.

Measure of success: Determine the adequacy of existing programs and methods of delivery of public hygiene education and develop a consensus plan to overcome any identified deficiencies.

9. Fully integrate sanitation facility needs in the rural roads priorities setting process. Develop a better understanding of the extent to which the existing funding and delivery mechanisms for rural utility roads are an impediment to drinking water and waste water facility construction.

Measure of success: Determine the extent to which rural utility roads are a major constraint to the delivery of sanitation systems in rural Alaska, complete an inventory of existing needs, and develop a plan to overcome constraints.

10. Better assess rural Alaska sanitation needs in non-Native communities.

Measure of success: Develop a methodology to more accurately estimate sanitation needs in communities which are not Alaska Native Villages (and not included in the IHS-SDS). Produce a more refined estimate of funding required to provide adequate sanitation in rural Alaska.

11. Develop a better understanding of the potential for alternative type systems to address needs in smaller villages.

Measure of success: Small villages have access to all the information that they require to assess the extent to which an alternative is a good fit to their particular needs and capabilities. RASC and communities provide feedback to agencies on desirability of alternatives.

12. Develop a better state, federal, and Alaska Native community understanding of the current and potential contributions and importance of state financial assistance programs (including Power Cost Equalization, Municipal Assistance, and State Revenue Sharing) to operation and maintenance of sanitation services. Evaluate methods to support increasing revenue sharing to rural communities to target improved O&M.

Measure of success: Produce and distribute information useful in state of Alaska public policy/budget formulation.

13. Develop an improved process for resolution of the issue of land ownership uncertainties created by unsurveyed and uncertified Native Allotments and unresolved ANCSA 14(C) claims.

Measure of success: Monitor the existing multi-agency group referenced in Section 9 in order to determine if it is effective in addressing these issues and identify additional measures, if they are needed.

14. Provide a forum to increase sensitivity of agencies to the needs/issues related to regulatory policies as they affect construction of sanitation facilities.

Measure of success: Conduct sessions with agencies, RASC and communities to identify measures to improve sanitation and resolve potential regulatory conflicts.

APPENDICES

APPENDIX A
Rural Alaska Sanitation Initiative
Federal Field Work Group
Membership, Headquarters and Field Staff

<u>Agency</u>	<u>Representative</u>
Action	Billy Joe Caldwell
Action/National Service Corporation	Dana Rogers
Administration for Native Americans	Dominic Mastrapasqua
Administration for Native Americans	Winnonah Warren
Alaska Area Native Health Service (IHS)	Tom Coolidge
Alaska Area Native Health Service (IHS)	Jim Crum
Alaska Department of Community and Regional Affairs	Michael Black
Alaska Department of Community and Regional Affairs	Ike Waits
Alaska Department of Environmental Conservation	Keith Kelton
Alaska Department of Environmental Conservation	John Sandor (Co-Chair)
Bureau of Indian Affairs	Albert Kahklen
Bureau of Indian Affairs	Joseph Kahklen
Bureau of Indian Affairs	Faith Williams
Bureau of Land Management	Bishop Buckle
Bureau of Land Management	Sandy Dunn
Bureau of Land Management	Jeff Holdren
City of Saint Paul	Larry Merculieff (Co-Chair)
Department of Commerce, Economic Development Administration	Frank Monteferrante
Department of Education	Howard F. Hjelm
Department of Housing and Urban Development	Donna Hartley
Department of Housing and Urban Development	Marlin Knight
Department of Housing and Urban Development	Bruce Knot
Department of Housing and Urban Development	Dominic Nessi
Department of Labor	Robert Lunz
Department of Transportation, Federal Highway Administration	Patrick Wlaschin

Environmental Protection Agency	Stephen Allbee
Environmental Protection Agency	Sylvia Bell
Environmental Protection Agency	Lee Daneker
Environmental Protection Agency	Michael Cook
Environmental Protection Agency	James Elder
Environmental Protection Agency	Al Ewing
Environmental Protection Agency	Charles Findley (Co-Chair)
Environmental Protection Agency	Judy Kane
Environmental Protection Agency	Gerald Opatz
Environmental Protection Agency	Marlene Regelski
Environmental Protection Agency	Daniel Steinborn
Environmental Protection Agency	Kathy Veit
Environmental Protection Agency	William Viera
Indian Health Service	Richard F. Barror
Indian Health Service	Gary J. Hartz
Indian Health Service	Steve Weaver
National Oceanic and Atmospheric Administration	Dave Hamm
Rural Economic and Community Development	Frank Muncy
Rural Economic and Community Development	James D. Schwartz
Natural Resources Conservation Service	Carl E. Bouchard
Natural Resources Conservation Service	Jim Schmidt
University of Alaska, Anchorage	Steve Colt
University of Alaska, Anchorage	Lee Gorsuch
U.S. Army Corps of Engineers	Georgeanne Reynolds

The Members of the Federal Field Work Group wish to acknowledge and express our appreciation for the valuable advice and contributions of the many organizations and individuals from the Alaska Native Community who participated with us in the process of developing this report.

APPENDIX B

Alaska Native Villages

Akhiok	Eklutna	Levelock	Rampart
Akiachak	Ekuk	Lower Kalskag	Red Devil
Akiak	Ekwok	Manley Hot Springs	Ruby
Akutan	Elim	Manokotak	Russian Mission
Alakanuk	Emmonak	Marshall	Saint George
Alatna	Evansville	McGrath	Saint Marys
Aleknagik	False Pass	Mekoryuk	Saint Michael
Allakaket	Fort Yukon	Mentasta Lake	Saint Paul
Ambler	Gakona	Metlakatla	Sand Point
Anaktuvuk Pass	Galena	Minto	Savoonga
Angoon	Gambell	Mt. Village	Saxman
Aniak	Golovin	Naknek	Scammon Bay
Annette	Goodnews Bay	Nanwalek	Selawik
Anvik	Grayling	Napakiak	Seldovia
Arctic village	Gulkana	Napaskiak	Shageluk
Atka	Healy Lake	Nelson Lagoon	Shaktolik
Atmautluak	Holy Cross	Nenana	Sheldon Point
Atkasuk	Hoonah	New Stuyahok	Shishmaref
Barrow	Hooper Bay	Newhalen	Shungnak
Beaver	Hughes	Newtok	Sleetmute
Bethel	Huslia	Nightmute	South Naknek
Birch Creek	Hydaburg	Nikolai	Stebbins
Brevig Mission	Igiugig	Nikolski	Stevens Village
Buckland	Illiamna	Ninilchik	Stony River
Cantwell	Ivanoff Bay	Noatak	Takotna
Chalkyitsik	Kake	Nome	Tanacross
Chefornak	Kaktovik	Nondalton	Tanana
Chenega	Kaltag	Noorvik	Tatitlek
Chevak	Karluk	Northway Village	Tazlina
Chickaloon	Kasaan	Nuiqsut	Telida
Chignik	Kasigluk	Nulato	Teller
Chignik Lagoon	Kiana	Nunapitchuk	Tetlin
Chignik Lake	King Cove	Old Harbor	Togiak
Chistochina	Kipnuk	Oscarville	Toksook Bay
Chitina	Kivalina	Ouzinkie	Tuluksak
Chuathbaluk	Klawock	Pedro Bay	Tuntutuliak
Circle	Klukwan	Perryville	Tununak
Clarks Point	Kobuk	Pilot Point	Twin Hills
Copper Center	Kokhonak	Pilot Station	Tyonek
Council	Koliganek	Pitkas Point	Ugashik
Craig	Kongiganak	Platinum	Unalakleet
Crooked Creek	Kotlik	Point Hope	Unalaska
Deering	Kotzebue	Point Lay	Upper Kalskag
Diomedes	Koyuk	Port Graham	Venetie
Dot Lake	Koyukuk	Port Heiden	Wainwright
Eagle Village	Kwethluk	Port Lions	Wales
Eek	Kwigillingok	Portage Creek	White Mountain
Egegik	Larsen Bay	Quinhagak	Yakutat

APPENDIX C

**Rural Alaska Communities
Not Defined As Alaska Native Villages**

Alcan	Glennallen	Northway Junction
Anchor Point	Gustavus	Paxson
Anderson City	Halibut Cove	Pelican City
Bettles City	Happy Valley	Point Baker
Big Delta	Harding Lake	Polk Inlet
Central	Healy	Port Alexander City
Chase	Hobart Bay	Port Alice
Clam Gulch	Hollis	Port Alsworth
Coffman Cove City	Hope	Port Protection
Cohoe	Hyder	Primrose
Cold Bay City	Kasilof	Rowan Bay
Cooper Landing	Kenny Lake	Skwentna
Copperville	Kupreanof City	Slana
Crown Point	Labouchere Bay	St. John Harbor
Cube Cove	Lake Minchumina	Sutton
Dora Bay	Lignite	Talkeetna
Dry Creek	Long Island	Tenakee Springs City
Eagle City	Lutak	Thorne Bay City
Edna Bay	McCarthy	Tonsina
Elfin Cove	Mendeltna	Trapper Creek
Ester	Meyers Chuck	Two Rivers
Ferry	Moose Pass	Whale Pass
Fox	Naukati Bay	Whittier City
Fox River	Nikolaevsk	Willow
Freshwater Bay	Northway	Womens Bay
Game Creek		

FOOTNOTES

1. As defined in the Alaska Native Claims Settlement Act, P.L. 92-203.
2. These Alaska rural communities were defined according to eligibility criteria under the Alaska Department of Environmental Conservation's Village Safe Water Program.
3. Some of the 192 Alaska Native Villages may have a significant non-Native Alaskan population and many of the 76 other rural Alaska communities may have a substantial Native Alaskan population. Data in Table 1 are a combination of 1990 census data and 1994 state population estimates.
4. A significant percentage of these households may be only seasonally or periodically occupied.
5. For the purposes of this report, "adequate" facilities are considered to be the types of sanitation facilities described in Section III.
6. Middaugh, John, M.D., State Epidemiologist, Division of Public Health, Alaska Department of Health and Social Services, Anchorage, Alaska, personal communication, November 9, 1994.
7. U.S. Congress, Office of Technology Assessment, An Alaskan Challenge: Native Village Sanitation, OTA-ENV-591 (Washington, D.C.: U.S. Government Printing Office, May 1994).
8. This report will use the term "flush/tank" systems rather than "haul" systems in order to avoid confusion with individual water haul/honey bucket systems which provide a level of service inferior to "flush/tank" systems and are considered unacceptable by the FFWG and the Alaska Native community.
9. Robinson, B.A. and G.W. Heinke, Northwest Territories Department of Municipal and Community Affairs, Canada, *The Effect of Municipal Services on Public Health in the Northwest Territories*, March, 1990.
10. Colt, Steve; Institute of Social and Economic Research, University of Alaska, Anchorage; Operations and Maintenance Issues in Rural Alaska Sanitation, August, 1994, page 12. (EPA Grant # X000945-01-0)
11. Ibid., page 12 ff.
12. Due to the limited analysis and simplifying assumptions in Colt's project, not all members of the FFWG are in agreement that these general conclusions can be drawn.
13. Ibid., page 8.
14. Ibid., page 20.
15. CH2M Hill, Anchorage, Alaska; NANA Regional Utility Feasibility Study; prepared for the NANA Corporation and the Alaska Department of Environmental Conservation Village Safe Water Program; April 1994 (EPA Grant # P3-000831-01)
16. "Comprehensive community planning for sanitation facilities" is considered to be the combination of community-level planning and facility planning.
17. RASC is a statewide Alaska Native organization, formed under the auspices of the Alaska Native Health Board, to represent Alaska Natives on rural sanitation issues.
18. Crum, Jim, Director, Office of Environmental Health and Engineering, Alaska Area Native Health Service (IHS), Anchorage, Alaska, personal communication, June 6, 1994.
19. Keith Kelton, Ibid.
20. A significant percentage of these households may be only seasonally or periodically occupied.